

CLAIMS

1. Radiation sensor (10) comprising
a support (1),
a cavity (2) which may be a recess or a through hole formed in one surface of the support (1),
a sensor element (4, 4a, 4b) formed above the cavity (2), preferably on a membrane (3) covering the cavity (2), and
electric terminals (5, 5a, 5b) for the sensor element (4, 4a, 4b),
characterised in that
the cavity (2) in the surface of the support (1) has a fully or partly rounded contour (2a).
2. Radiation sensor (10) according to claim 1, characterised in that the support (1) has a rectangular and particularly a square contour (1a).
3. Radiation sensor (10) according to claim 1 or 2, characterised in that the cavity (2) has an oval or round contour (2a).
4. Radiation sensor (10) according to claims 2 and 3, characterised in that one or more electric terminals (5, 5a, 5b) are provided in a corner section (6, 6a – 6d) of the sensor (10).
5. Radiation sensor (10) according to one or more of the preceding claims, characterised in that the side wall of the cavity (2) is at least partly perpendicular to the support surface.

6. Radiation sensor (10) according to one or more of the preceding claims, characterised in that the cavity (2) is manufactured by dry etching.
7. Radiation sensor (10) according to one or more of the preceding claims, characterised in that the sensor element (4, 4a, 4b) is a thermopile.
8. Radiation sensor (10) according to one or more of the preceding claims, characterised in that a plurality of sensor elements are formed above one cavity.
9. Radiation sensor (10) according to one or more of the preceding claims, characterised in that the cavity (2) in the surface of the support (1) has a contour (2a) which is not exclusively defined by straight lines.
10. Radiation sensor (10) according to one or more of the preceding claims, characterised by one or more of the following features:
 - the membrane material comprises a dielectric, particularly silica and/or silicon nitride,
 - under the membrane an etching stop layer containing an oxide, particularly silica, is provided,
 - the support material contains silicon and/or GaAs and/or a semiconductor material.

11. Radiation sensor (10) according to one or more of the preceding claims, characterised by one or more of the following dimensions:
 - support height H: more than 50 μm , preferably more than 200 μm , less than 1,500 μm , preferably less than 600 μm ,
 - support edge length L: less than 2 mm, preferably less than 1.5 mm,
 - cavity diameter D: more than 55 %, preferably more than 65 % and/or less than 90 %, preferably less than 80 % of the support edge length,
 - membrane thickness D: less than 3 μm , preferably more than 0.1 μm .
12. Wafer (30) comprising a plurality of blanks for radiation sensors (10) according to one or more of the preceding claims formed on it, characterised in that the blanks are arranged on the wafer (30) in a rectangular, rhombic, triangular or hexagonal grid (31, 32).
13. Sensor array (40) comprising a plurality of radiation sensors (10) according to one or more of claims 1 to 11.
14. Sensor array (40) according to claim 13, characterised in that a plurality of radiation sensors (10) are arranged in two or more rows (41) and in two or more columns (42).
15. Sensor module (50) comprising

- a radiation sensor (10) according to one or more of claims 1 to 11 or a sensor array (20) according to claim 13 or 14,
 - a housing (51) in which the radiation sensor (10) or the sensor array (20) is accommodated,
 - an optical window (52) in the housing (51), and
 - electric terminals (53) protruding from the housing (51), said electric terminals (53) being connected to the terminals (5, 5a, 5b).
16. Sensor module (50) according to claim 15, characterised by an optical projection element, particularly a lens (52) or a mirror.
17. Method for manufacturing a radiation sensor (10) comprising the steps:
- production of a plane wafer,
- application of an etching stop layer on a first surface of the wafer and formation of a mechanically stable membrane on top of it,
- application of an etching mask having one or more openings with at least partly rounded contours on the second surface of the wafer, and
- dry etching of cavities in the wafer from the second surface in the direction towards the etching stop layer.